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(54) **SELF-SCORING ELECTRONIC TARGET GAME WITH DISPLAYS.**

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Description

This invention relates generally to electronic games, and more particularly to computerized dart games which automatically register and display the score attained by players. In its principal aspects the invention is concerned with an improved computerized electronic target game which is characterized by the provision of display capabilities for displaying game conditions and information in respect to games in play.

Electronic dart games are well known from Jones et al. U.S. Pat. No. 4,057,251; Zammuto U.S. Pat. No. 4,561,660 and Brejcha et al. U.S. Pat. No. 4,586,716. These patents relate to the use of "safe" darts made with a slender flexible plastic tip which is virtually incapable of piercing human skin and unlikely to cause damage when hitting objects other than the dart board. Jones et al. introduced the "safe" darts and a dart board divided into an array of target plates with a large number of closely spaced holes for securing darts thrown at the board. The impact force of a thrown dart displaces a target plate and momentarily closes an associated switch to electrically indicate a dart hit. Zammuto improves on the game by using a solid rubber damper sheet for biasing target sections and a matrix switch of imprinted Mylar sheets to increase reliability in scoring. Brejcha et al. further enhances the game by providing a double bullseye as in the official bristol dart board of the British darts organization.

Other electronic dart game apparatus are disclosed in DeVale et al. U.S. Pat. No. 4,516,781, which forms the basis for the preamble of claim 1. The DeVale apparatus has an electronic memory storage area which contains algorithms for scoring dart games with relatively simple rules, such as High Score, Shanghai, and Scram. Other games include 301 and 501, with or without double-in and double-out features. Selection means are provided for selecting the algorithms for a particular one of the plurality of different dart games. Devale utilizes an electronic data processor to detect and distinguish electrical indications of a dart hit and to calculate appropriate dart game conditions for the selected game. The dart game conditions are displayed by a combination of light emitting diodes driven by the microprocessor and decals printed on the face of the machine.

SUMMARY OF THE INVENTION

A primary object of the present invention is to provide an electronic dart game with display means for displaying various information about the dart game, including scoring and instruction information. This novel display feature allows scoring and the display of game conditions for dart games with relatively complex rules which previously have only been scored by hand.

A related object of the present invention is to use the display means to display dart game information in a manner which is amusing and entertaining to the dart game players.

Another important object of the present invention is to electronically store the rules and instructions for a variety of different dart games in a static electronic memory unit which may easily be removed and interchanged from the game, thereby providing a convenient means for changing and introducing new dart games.

In accordance with the foregoing objects, an electronic dart game apparatus for automatically scoring a dart game is provided, wherein the apparatus comprises: a dartboard forming a target for darts thrown by players of said dart game, said target having a plurality of scoring segments wherein one or more of said scoring segments comprise a scoring element, and sensing means for electrically indicating when one of said scoring segments is hit by a thrown dart; a first electronic memory storage area containing algorithms for scoring one or more different dart games; selection means for selecting said algorithms for a particular one of said one or more different dart games; and an electronic data processor means for (a) detecting and distinguishing said electrical indication of a target scoring segment hit by a thrown dart, (b) calculating from said algorithms selected by said selection means appropriate dart game conditions for each player, including the score, and (c) providing said conditions for display; said electronic dart game apparatus characterized in that:

said first electronic memory storage area contains algorithms for at least one dart game wherein the value of points earned in a particular turn is dependent upon the scoring segments hit during previous turns of all players;

it comprises a second electronic memory storage area in which information regarding which of one or more of said scoring elements were hit by a thrown dart during at least one previous turn of the same player is retained; and

said electronic data processor means is responsive to said dartboard, said first and second memory storage areas, and said selection means and provides said hit information for display.

BRIEF DESCRIPTION OF THE DRAWINGS

Other objects and advantages of the invention will become apparent from the following detailed description and the accompanying drawings, in which:

Figure 1 is a perspective drawing of an electronic dart game incorporating the invention;
Figure 2 is a block diagram showing the relationship between the internal components of the game;
Figure 2a is a block diagram showing the relationship between the internal components of the game in an alternative embodiment;
FIG. 3 is a flowchart of the POWER UP sequence of the game;
FIG. 4 is a flowchart of the diagnostics routine;
FIG. 5 is a flowchart of the SET UP procedures; and
FIGS. 6-9 are flowcharts depicting the logic flow of a cricket game of darts.

DETAILED DESCRIPTION OF THE INVENTION

Turning now to the drawings, Fig. 1 shows an embodiment of the invention having an electronic dart board 11 mounted in an upright cabinet 12. The electronic dart board 11 serves as a target for darts 13 which are adapted to be thrown at the board. The darts are preferably of the "safe" type in that they are virtually incapable of penetrating skin and unlikely to cause damage by accidentally hitting objects other than the dart board. The dart board 11 is divided into a plurality of separate target sections or plates 14 denoting different target areas. Each target plate contains a large number of closely spaced holes for securing a dart in the section by its tip after being thrown at and striking the target section.

The target plates 14 are slidably mounted in a spider framework 15 of radially extending ribs and concentric circular ribs thereby preventing lateral movement of the target section. Each rib is of substantially triangular cross-section so that if struck by a dart, the dart deflects off to one of the target sections and into a hole instead of merely bouncing off the rib. To insure proper sliding movement in the spider framework 15, target sections 14 typically have guides attached to their outside edges in the form of ridges. Each of the target sections has a switch device located behind such that the impact force of a thrown dart hitting a target section displaces the target section back to a position which closes the switch momentarily signaling a target section hit; the target section then returns to its normal open position at the face of the board. The switches associated with the target sections are kept in their normally open positions by biasing the target sections to the face of the board using a resilient biasing material such as a solid rubber sheet. A switch matrix of imprinted Mylar sheets are preferably used, providing switching of the desired duration and continuity during the momentum transfer from a dart.

On the control panel 16 of the dart game are several push button switches 17 for selecting between different dart games and various game options such as the number of players. A next player button is provided to signal, when necessary, to the game that a particular player's turn is over. In the event that a player throws a dart and misses the dart board completely, the game will be unable to detect this miss until the player presses the next player button indicating that he has thrown 3 darts and his turn is over. A pair of coin slots 18 are located in the base of the machine for operating this coin-operated version of the game.

Display means 19 is located alongside the control panel 16 for displaying various information about the operation and conditions of the game. In the initial stage of a game the display means 19 indicates the number of coins dropped into the machine and the corresponding game options available. The number of players in the game is determined by the number of coins received through the coin slots 18. The display means 19 guides a player through the selection of a game and the number of players in the game. As a function of its display capabilities, the display means 19 described herein allows for more than one display device such as a video display screen, liquid crystal display, electronic display or the likes. As will be apparent from the following description, display means of the present invention includes the video display screen and/or liquid crystal display. Typically, one of the control panel push buttons will act as a sequencer through the various games available, while another push button is used to select the current game in the sequence. During the selection process the display means provides a player with the options and choices available to him for selection. A series of audible tones are generated by a speaker 20 to guide a player through the selection process. For example, a bell may be used to assist the player by acknowledging that his choice has been registered; a buzzer may inform him that he is attempting to make an invalid selection.

Turning to Fig. 2, a block diagram of the internal components of the invention is shown. The microprocessor 22 is at the heart of the operation by providing signals for operating sound 23, video generation circuitry 24; reading signals from the target head 34 and control panel input/output circuitry 26; and running instructions encoded in the erasable programmable read-only memory (EPROM) 27 for proper game operation. In a block diagram of the internal components of an alternative embodiment, depicted in Fig. 2a, the LCD driving circuit 4 drives the liquid crystal display 3 in response to signals received from the microprocessor 22. The microprocessor uses the random ac-

cess memory (RAM) 28 as a working area to calculate and store temporary values. Preferably RAM 28 is supplied with an internal battery backup (not shown), and a small portion of the memory may be used by the microprocessor 22 to store high scores, game popularity data or similar values which are desired to be retained when the power is turned off. The EPROM 27 contains all the microprocessor instructions necessary for proper operation of the games. This includes instructions for initialization, game and player selection processes, and all the instructions necessary to play each of the available games.

According to one important aspect of the invention, the EPROM 27 is contained within a single unit such as a cartridge which may easily be removed and interchanged, thus allowing a different set of instructions to be used for operation. This feature provides a convenient means for changing the rules of particular games, perhaps for a certain geographical region where such rules are more common or preferred. Whenever such a change is made, all the other components and connections remain the same except for the EPROM 27 and panel 16 which may list the games available. This feature also allows games to be changed periodically to produce variety and may also be used to keep the more popular games or rules available.

Synchronization of the various operations of the system is done via the reset and interrupt timing circuitry 29 which alerts the system to interrupt and reset conditions, such as may occur when coins are dropped into the machine or certain control panel signals are received. The push button input 30 signals from the control panel are linked to the system via the control panel input/output circuitry 26. Indicator lamps 31 on the control panel are also driven by this control panel input/output circuitry 26. The microprocessor 22 sends appropriate signals to the sound circuitry 23 to drive a speaker 32 for generating a variety of different sound effects. The microprocessor 22 also sends appropriate signals to to the video generator with video RAM 24 to drive the video display monitor 33; and/or to the LCD driving circuit 4 to drive the liquid crystal display 3 according to different events and conditions of the game. Signals from the target head with switch matrix 25 are received by the target head interface circuitry 36 for conversion to a form which may readily be read and recognized by the target head input/output circuitry 34. The throw and remove darts indicator lamps 35 are driven by the target head input/output circuitry 34, which receives target head indicator lamp control signals from the microprocessor 22.

Turning now to FIG. 3, a flow diagram of the power up procedure of the invention is shown. Upon power up (step 40), an initialization routine (step 41) begins which includes initializing various parts of the CPU such as the program counter, stack pointer and internal registers. The RAM memory is then initialized along with the various I/O ports and displays. Next, in step 42, if a TEST button (usually located behind the coin slot door) is depressed then a diagnostic routine will be run in step 43, otherwise game set up procedures will begin from step 44.

A flow diagram of the diagnostic routine is given in FIG. 4; it tests and checks several elements of the invention to insure proper operation. The first step in the diagnostic routine is the EPROM and RAM checksum test in step 46. In step 47, if the results of the checksum tests show no indication of error, then execution continues to step 52; otherwise, a "RAM BAD" message is displayed in step 48. Upon completion of a good checksum test, the lamps on the game are tested individually in step 53, along with a test of the various sounds (step 54) and the displays (step 55). Next, in step 56, the game popularity registers and coin counter values are displayed as read from the RAM with internal battery backup. At this point in step 57, if the TEST button has been pressed or a coin has been received then the SETUP procedure is initiated from step 58. Otherwise, further diagnostic testing is done consisting of the dart board switch matrix being read (step 59) and displayed (step 60). This additional diagnostic procedure then loops back to step 57 and repeats until the TEST button has been pressed or a coin has been received which begins the SETUP procedure in step 58.

The game SETUP procedure as shown in FIG. 5 counts the money received, selects the particular game to be played and selects the number of players in the game. In the present embodiment of the invention there are eight different games and two cost categories -- the one-coin games and the two-coin games. Games 1 through 3 are designated as one-coin games and games 4 through 8 are designated as two-coin games. Until a coin is received by the game, an 'ATTRACT' display screen is displayed (step 71) to draw attention and attract players to the game. Upon receiving a coin in step 72, a SELECT GAME display is shown in step 73 to provide information and the utility for selecting a particular game of the many which are available. As is apparent from Fig. 2a, information for display may be routed to the video display or the LCD display, or preferably both displays. During the game selection procedure, one of the games is designated as the 'current' game. This is done by distinguishing one game from the others by boxing the name, or using flashing or highlighting display attributes. The player has the option of selecting the 'current' game or changing the

'current' game to the next available game in the sequence. In step 74, if the PLAYER CHANGE button is pressed, the 'current' game is selected, then the displays are updated in step 75, the number of players for the game are determined from the number of coins received in step 76 and execution branches to the start of the selected game from step 77. If in step 78 the SELECT button was pressed instead of the PLAYER CHANGE button then the game count is incremented as in step 79. Step 80 checks which cost category the 'current' game is in. If the game count is greater than 3, then it is a two-coin game and step 81 is done, otherwise it is a one-coin game and step 83 is done. In step 81, if the game has received less than two coins, then the game count is set back to 1 in step 82, so a two-coin game cannot be selected. In step 83 the game count is checked to see if it is greater than the maximum number of 8. If the game count is greater than 8 then it is set back to 1 in step 84, otherwise step 84 is bypassed. Next, in step 85, the displays are updated to reflect the new selection information, then the procedure loops back to step 74 for another selection iteration. This looping continues until a game selection is made in step 74, which in turn results in the start of the selected game in step 77.

As an example, one of the games which may be played is the game of cricket. Cricket is a dart game with a more complex set of rules for determining game conditions and scoring. The game is usually played by two players and only uses segments 15-20 and the bullseye. At any time, a segment is either "open" or "closed" for a particular player. At the beginning of the game all segments are "open"; a segment becomes "closed" by a player by scoring 3 hits in the segment. The hits can be 1 triple hit, 1 single and 1 double, or 3 single hits. A player scores points in a segment which he has closed yet still remains open for the other player. The player scoring 3 hits in all segments 15-20 and the bullseye, and scoring the highest number of points wins. The display features of the present invention provide means for indicating to the players the open and closed segments and the current score, allowing the cricket game to be self-scoring rather than scored by hand -- the only method available previously. Figs. 6-9 show the logic flow of a cricket game as realized in the preferred embodiment of the invention.

Execution of the cricket game begins in step 91 with initialization and continues to step 92 which runs a game startup routine. Next, in step 94, the number of darts thrown at and registered by the board are checked. If there were 3 darts thrown then the player's turn is over and the procedure goes to step 95. Otherwise, in step 104, the game waits until either a dart is thrown or the PLAYER CHANGE button is pressed. In step 105, if the PLAYER CHANGE button was pressed, then the player has thrown 3 darts as indicated in step 106, and execution goes back to step 93. Otherwise, a dart was thrown and registered by the dart board and the segment number that was hit along with its value is recorded in step 108. Next, in step 109, if the segment number was not in the range 15-20 or a bullseye, then the hit does not affect the score and the game gets prepared for the next dart by branching to the NXDART routine from step 110. If the hit was within the range 15-20 or a bullseye, then the segment is checked to see if it was closed by both players in step 111; if it was, then NXDART is done from step 112, otherwise the procedure goes to step 113. In step 113, if the segment has been closed by the opposing player and is still open for the current player then the score will not be affected, but the hit counter for the segment hit must be updated and a check must be done to see if the segment should now be closed. Step 115 updates the hit counter for the segment and step 116 checks to see if the necessary 3 hits required to close the segment have been made. If 3 hits have been made on the segment, then it is closed in step 117. The NXDART routine is then started from step 118. If in step 113 the opposing player segment closed and the current player open condition is not true then the procedure branches from step 114 to step 120 in Fig. 7. In step 121, if the segment is not open for both players, then it can be deduced from the previous logic flow that the segment was closed by the current player and is still open for the opposing player. Under this condition, the current player adds points to his score by branching to the ADDSCR routine from step 122. If in step 121 the segment was open for both players, then the segment hit counter for the current player is updated in step 123, and in step 124 the segment is checked to see if it has the necessary number of hits to be closed. If the segment does not have more than 2 hits then the NXDART routine is evoked from step 125, otherwise the segment is closed in step 126. If the current player hit a segment which gave him more that the required number of hits to close the segment (i.e. a double or triple segment), then the extra hits are calculated in step 127 and the score is updated accordingly by branching to ADDSCR from step 128.

The ADDSCR routine in Fig. 8 does the necessary updating of the current player score. The temporary score is the score the current player has achieved so far during his turn in the round. This value is updated in step 131, then the current player total score is updated in step 132. The procedure then branches to the NXDART routine

from step 133. Fig. 9 shows the NXDART routine which prepares the game for the next dart to be thrown. The dart count is incremented in step 136 and the displays are updated in step 137. If a bullseye was hit, then a "WHOOPEE" sound is done in step 138. The procedure then loops from step 139 of Fig. 9 to step 93 of Fig. 6 to continue the game. The looping continues until a winner is determined.

In step 94 of Fig. 6, if the player has thrown 3 darts then his turn is over and the procedure continues to step 95. If the current player was the last player in the group then a check for a winner is done in step 98, otherwise a routine to change players is done in step 96 and the procedure loops back to step 93 from step 97. In step 99, if a winner has been determined then an end game routine is done in step 100 followed by the SETUP procedure for a new game. If there is no winner yet in step 99, then a routine to change players is done in step 102 and the procedure loops back to step 93 from step 103.

From the foregoing, it can be seen that the self-scoring electronic target game of the present invention may be used for playing dart games with many intricate and complex rules. The invention is equipped with one or more displays for selecting a game and displaying information during the play of the game such as score and various game conditions. Furthermore, different games can be chosen and new ones introduced by virtue of having a removable cartridge -- a static electronic memory unit -- which may conveniently be removed and interchanged from the game.

Claims

1. An electronic dart game apparatus for automatically scoring a dart game, said apparatus comprising: a dartboard (11) forming a target for darts thrown by players of said dart game, said target having a plurality of scoring segments (14) wherein one or more of said scoring segments (14) comprise a scoring element, and sensing means (25) for electrically indicating when one of said scoring segments (14) is hit by a thrown dart; a first electronic memory storage area (27) containing algorithms for scoring one or more different dart games; selection means (17) for selecting said algorithms for a particular one of said one or more different dart games; and an electronic data processor means (22) for (a) detecting and distinguishing said electrical indication of a target scoring segment (14) hit by a thrown dart, (b) calculating from said algorithms selected by said selection means (17) appropriate dart game conditions for each player, including the score, and (c) providing said conditions for display; said electronic dart game apparatus characterized in that:

   said first electronic memory storage area (27) contains algorithms (90) for at least one dart game wherein the value of points earned in a particular turn is dependent upon the scoring segments hit during previous turns of all players;

   it comprises a second electronic memory storage area (28) in which information regarding which of one or more of said scoring elements were hit by a thrown dart during at least one previous turn of the same player is retained; and

   said electronic data processor means (22) is responsive to said dartboard (11), said first and second memory storage areas (27, 28), and said selection means (17) and provides said hit information for display.

2. An electronic dart game apparatus as claimed in claim 1, wherein said apparatus further characterized in that it comprises means (19) for displaying said conditions and an indication of said hit information.

3. An electronic dart game apparatus as claimed in claim 2, wherein said display means (19) includes a video display screen or a liquid crystal display.

4. An electronic dart game apparatus as claimed in any preceding claim wherein said first electronic memory storage area (27) is contained within a single removable cartridge for replacement or interchange with another cartridge containing a first electronic memory storage area (27) having different algorithms for different dart games.

5. An electronic dart game apparatus as claimed in any previous claim, wherein said hit information includes information regarding which of one or more of said scoring elements were hit by a thrown dart during at least one previous turn of each player.

6. An electronic dart game apparatus as claimed in any previous claim, wherein said hit information includes information regarding the number of times a scoring element was hit by each player over a plurality of turns.

7. An electronic dart game apparatus as claimed in any previous claim, wherein said hit information includes information regarding the number of times each scoring element was hit by each

player over a plurality of turns.

8. An electronic dart game apparatus as claimed in any previous claim, wherein said dart game is the dart game of Cricket.

9. An electronic dart game apparatus as claimed in any previous claim, wherein said dartboard (11) comprises a plurality of radially extending ribs and concentric circular ribs (15) dividing the dartboard (11) into said plurality of scoring segments (14), each of said scoring segments (14) containing a large number of closely spaced holes corresponding substantially to the cross-sectional dimension of said dart.

10. An electronic dart game apparatus as claimed in any previous claim, wherein said sensing means (25) comprise a switch matrix.

Patentansprüche

1. Ein elektronisches Wurfpfeilspielgerät zum automatischen Zählen eines Wurfpfeilspieles, wobei das genannte Gerät umfaßt: eine Wurfpfeilscheibe (11), die ein Ziel für von Spielern des genannten Wurfpfeilspieles geworfenen Wurfpfeilen bildet, wobei das genannte Ziel eine Mehrzahl von Zählabschnitten (14), wobei einer oder mehrere der genannten Zählabschnitte (14) ein Zählelement umfaßt, und eine Erfassungseinrichtung (25) zum elektronischen Anzeigen aufweist, wenn einer der genannten Zählabschnitte (14) von einem geworfenen Wurfpfeil getroffen ist; einen ersten, elektronischen Gedächtnisspeicherbereich (27), der Algorithmen zum Zählen von einem oder mehreren unterschiedlichen Wurfpfeilspielen enthält; eine Auswähleinrichtung (17) zum Auswählen der genannten Algorithmen für ein besonderes des/der genannten einen oder mehreren unterschiedlichen Wurfpfeilspiele; und eine elektronische Datenverarbeitungseinrichtung (22) zum (a) Erfassen und unterscheiden der genannten elektrischen Anzeige eines Zielzählabschnittes (14), der von einem geworfenen Wurfpfeil getroffen ist, zum (b) Berechnen von geeigneten Wurfpfeilspielbedingungen für jeden Spieler von den Algorithmen, die durch die genannte Auswähleinrichtung (17) ausgewählt sind, unter Einschluß des Zählstandes, und zum (c) Bereitstellen der genannten Bedingungen zur Anzeige; wobei das genannte elektronische Wurfpfeilspielgerät dadurch gekennzeichnet ist, daß:

der erste, elektronische Gedächtnisspeicherbereich (27) Algorithmen (90) für wenigstens ein Wurfpfeilspiel enthält, wobei der Stand der bei einem speziellen an-der-Reihe-sein verdienten Punkte von den Zählabschnitten abhängt, die während vorhergehendem an-der-Reihe-sein aller Spieler getroffen worden sind;

es einen zweiten, elektronischen Gedächtnisspeicherbereich (28) umfaßt, in dem Informationen zurückgehalten werden, die betreffen, welches von einem oder mehreren der genannten Zählabschnitte von einem geworfenen Wurfpfeil während wenigstens eines vorhergehenden an-der-Reihe-sein desselben Spielers getroffen worden war; und

die genannte elektronische Datenverarbeitungseinrichtung (22) auf die genannte Wurfpfeilscheibe (11), den genannten ersten und zweiten Gedächtnisspeicherbereich (27, 28) und die genannte Auswähleinrichtung (17) ansprechbar ist und die genannte Trefferinformation zur Anzeige liefert.

2. Ein elektronisches Wurfpfeilspielgerät, wie es in Anspruch 1 beansprucht ist, wobei das genannte Gerät ferner dadurch gekennzeichnet ist, daß es eine Einrichtung (19) zum Anzeigen der genannten Zustände und eine Angabe der genannten Trefferinformation umfaßt.

3. Ein elektronisches Wurfpfeilspielgerät, wie es in Anspruch 2 beansprucht ist, wobei die genannte Anzeigeeinrichtung (19) einen Videoanzeigeschirm oder eine Flüssigkristallanzeige einschließt.

4. Ein elektronisches Wurfpfeilspielgerät, wie es in irgendeinem vorhergehenden Anspruch beansprucht ist, wobei der genannte erste, elektronische Gedächtnisspeicherbereich (27) in einer einzelnen entfernbaren Patrone zum Austausch oder Wechsel mit einer anderen Patrone enthalten ist, die einen ersten, elektronischen Gedächtnisspeicherbereich (27) enthält, der unterschiedliche Algorithmen für unterschiedliche Wurfpfeilspiele aufweist.

5. Ein elektronisches Wurfpfeilspielgerät, wie es in irgendeinem vorhergehenden Anspruch beansprucht ist, wobei die genannte Trefferinformation Informationen einschließt, die betreffen, welches von einem oder mehreren der genannten Zählelemente von einem geworfenen Wurfpfeil während wenigstens eines vorhergehenden an-der-Reihe-sein von jedem Spieler getroffen worden war.

6. Ein elektronisches Wurfpfeilspielgerät, wie es in irgendeinem vorhergehenden Anspruch beansprucht ist, bei dem die genannte Trefferin-

formation Informationen einschließen, die die Anzahl der Male betreffen, die ein Zählelement von jedem Spieler während einer Mehrzahl des an-der-Reihe-sein getroffen worden war.

7. Ein elektronisches Wurfpfeilspielgerät, wie es in irgendeinem vorhergehenden Anspruch beansprucht ist, bei dem die genannten Trefferinformationen Informationen einschließen, die die Anzahl der Male betreffen, die jedes Zählerelement von jedem Spieler während einer Mehrzahl des an-der-Reihe-sein getroffen worden war.

8. Ein elektronisches Wurfpfeilspielgerät, wie es in irgendeinem vorhergehenden Anspruch beansprucht ist, wobei das genannte Wurfpfeilspiel das Cricket-Wurfpfeilspiel ist.

9. Ein elektronisches Wurfpfeilspielgerät, wie es in irgendeinem vorhergehenden Anspruch beansprucht ist, wobei die genannte Wurfpfeilscheibe (11) eine Mehrzahl sich radial erstrekkender Rippen und konzentrische Kreisrippen (15) umfaßt, die die Wurfpfeilscheibe (11) in die genannte Mehrzahl von Zählabschnitten (14) unterteilt, wobei jeder der genannten Zählabschnitte (14) eine große Anzahl von eng beabstandeten Löchern enthält, die im wesentlichen der Querschnittsabmessung des genannten Wurfpfeils entsprechen.

10. Ein elektronisches Wurfpfeilspielgerät, wie es in irgendeinem vorhergehenden Anspruch beansprucht ist, wobei die genannte Erfassungseinrichtung (25) eine Schaltermatrix umfaßt.

Revendications

1. Dispositif de jeu électronique à fléchettes pour compter automatiquement les points d'un jeu de fléchettes, le dispositif comprenant : un panneau de fléchettes (11) formant une cible pour des fléchettes lancées par des joueurs du jeu de fléchettes, la cible ayant une pluralité de segments de comptage de points (14), dans lesquels un ou plusieurs des segments de comptage de points (14) comportent un élément de comptage de points, et des moyens de détection (25) pour indiquer électriquement si un des segments de comptage de points susdits (14) est heurté par une fléchette lancée, une première zone de mémorisation à mémoire électronique (27) qui contient des algorithmes pour compter les points d'un ou de plusieurs jeux différents de fléchettes, des moyens de sélection (17) pour sélectionner les algorithmes pour un jeu particulier parmi un ou plusieurs jeux différents de fléchettes, et des moyens de traitement électronique de données (22) pour (a) détecter et distinguer ladite indication électrique d'un segment de comptage de points (14) de la cible heurté par une fléchette lancée, (b) calculer, à partir des algorithmes susdits sélectionnés par lesdits moyens de sélection (17), des conditions appropriées de jeu de fléchettes pour chaque joueur, y compris le comptage des points, et (c) mettre à disposition lesdites conditions pour un affichage, le dispositif électronique de jeu de fléchettes étant caractérisé en ce que :

la première zone de mémorisation à mémoire électronique (27) contient des algorithmes (90) pour au moins un jeu de fléchettes dans lequel la valeur des points gagnés dans un tour particulier dépend des segments de comptage de points heurtés pendant des tours précédents de tous les joueurs,

il comprend une seconde zone de mémorisation à mémoire électronique (28) dans laquelle sont retenues des informations concernant l'élément qui a été heurté par une fléchette lancée, parmi un ou plusieurs desdits éléments de comptage de points, pendant au moins un tour précédent du même joueur, et

les moyens de traitement électronique de données (22) sont sensibles au panneau de fléchettes (11) susdit, aux première et seconde zones de mémorisation à mémoire (27, 28) et aux moyens de sélection (17) et ils procurent pour l'affichage ladite information d'impact.

2. Dispositif de jeu électronique à fléchettes suivant la revendication 1, dans lequel le dispositif est caractérisé en outre en ce qu'il comprend des moyens (19) pour un affichage desdites conditions et d'une indication de ladite information d'impact.

3. Dispositif de jeu électronique à fléchettes suivant la revendication 2, caractérisé en ce que les moyens d'affichage (19) comportent un écran d'affichage vidéo ou un affichage à cristaux liquides.

4. Dispositif de jeu électronique à fléchettes suivant l'une quelconque des revendications précédentes, caractérisé en ce que la première zone de mémorisation à mémoire électronique (27) est contenue dans une unique cartouche amovible pour un remplacement ou un échange avec une autre cartouche contenant une première zone de mémorisation à mémoire électronique (27) qui a différents algorithmes pour différents jeux de fléchettes.

5. Dispositif de jeu électronique à fléchettes suivant l'une quelconque des revendications précédentes, caractérisé en ce que l'information d'impact comporte une information concernant l'élément qui a heurté par une fléchette lancée, parmi un ou plusieurs des éléments de comptage de points pendant au moins un tour précédent de chaque joueur.

6. Dispositif de jeu électronique à fléchettes suivant l'une quelconque des revendications précédentes, caractérisé en ce que l'information d'impact comporte une information concernant le nombre de fois qu'un élément de comptage de points a été heurté par chaque joueur sur une pluralité de tours.

7. Dispositif de jeu électronique à fléchettes suivant l'une quelconque des revendications précédentes, caractérisé en ce que l'information d'impact comporte une information concernant le nombre de fois que chaque élément de comptage de points a été heurté par chaque joueur sur un pluralité de tours.

8. Dispositif de jeu électronique à fléchettes suivant l'une quelconque des revendications précédentes, caractérisé en ce que le jeu de fléchettes est le jeu de fléchettes du Cricket.

9. Dispositif de jeu électronique à fléchettes suivant l'une quelconque des revendications précédentes, caractérisé en ce que le panneau de fléchettes (11) comporte une pluralité de traverses qui s'étendent radialement et de traverses circulaires concentriques (15) qui divisent le panneau de fléchettes (11) en ladite pluralité de segments de comptage de points (14), chacun des segments de comptage de points (14) contenant un grand nombre de trous à espacement serré qui correspondent sensiblement à la dimension de section transversale de ladite fléchette.

10. Dispositif de jeu électronique à fléchettes suivant l'une quelconque des revendications précédentes, caractérisé en ce que les moyens de détection (25) susdit comprennent une matrice de commutateurs.

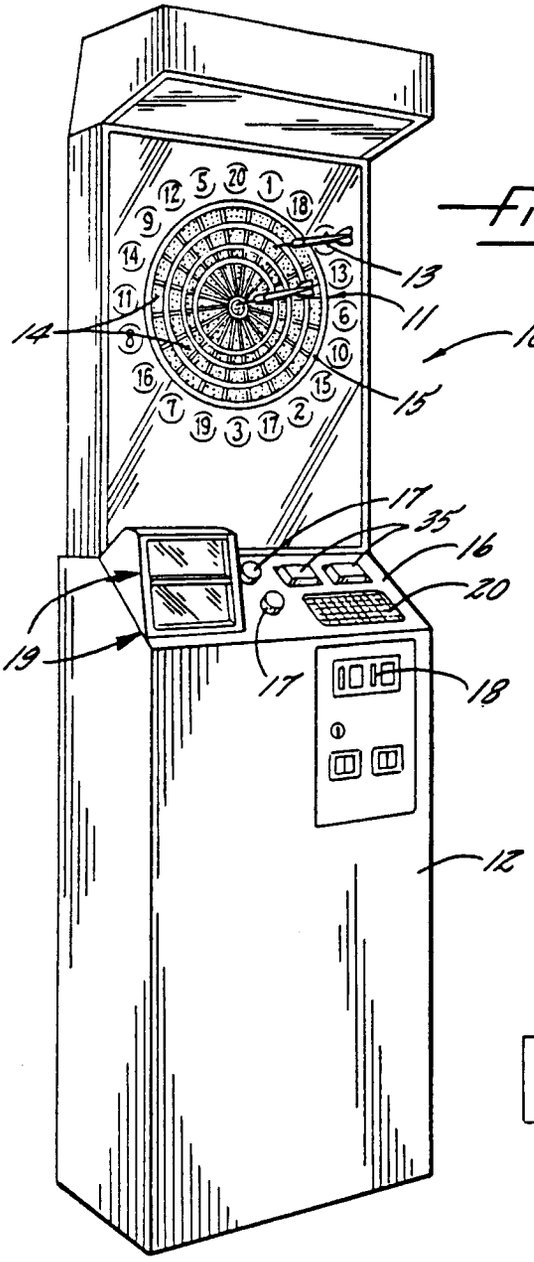

13
11
14
10
15
17
35
16
20
19
17
18
12

Fig. 1.

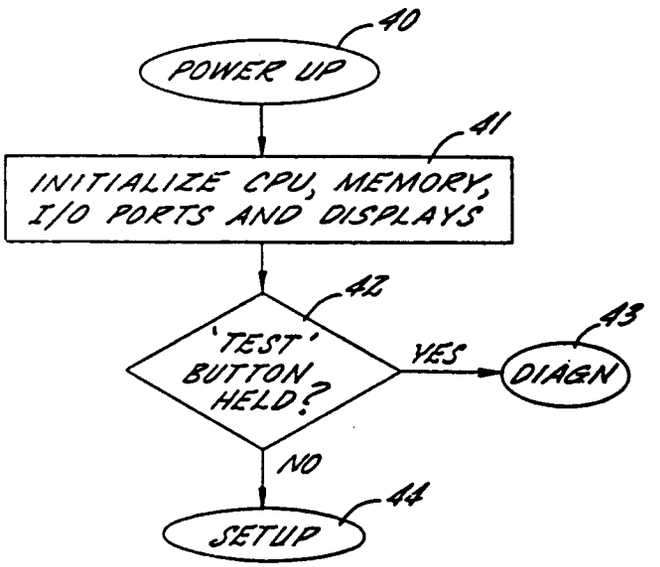

40
POWER UP
41
INITIALIZE CPU, MEMORY, I/O PORTS AND DISPLAYS
42
'TEST' BUTTON HELD?
YES
43
DIAGN
NO
44
SETUP

Fig. 3

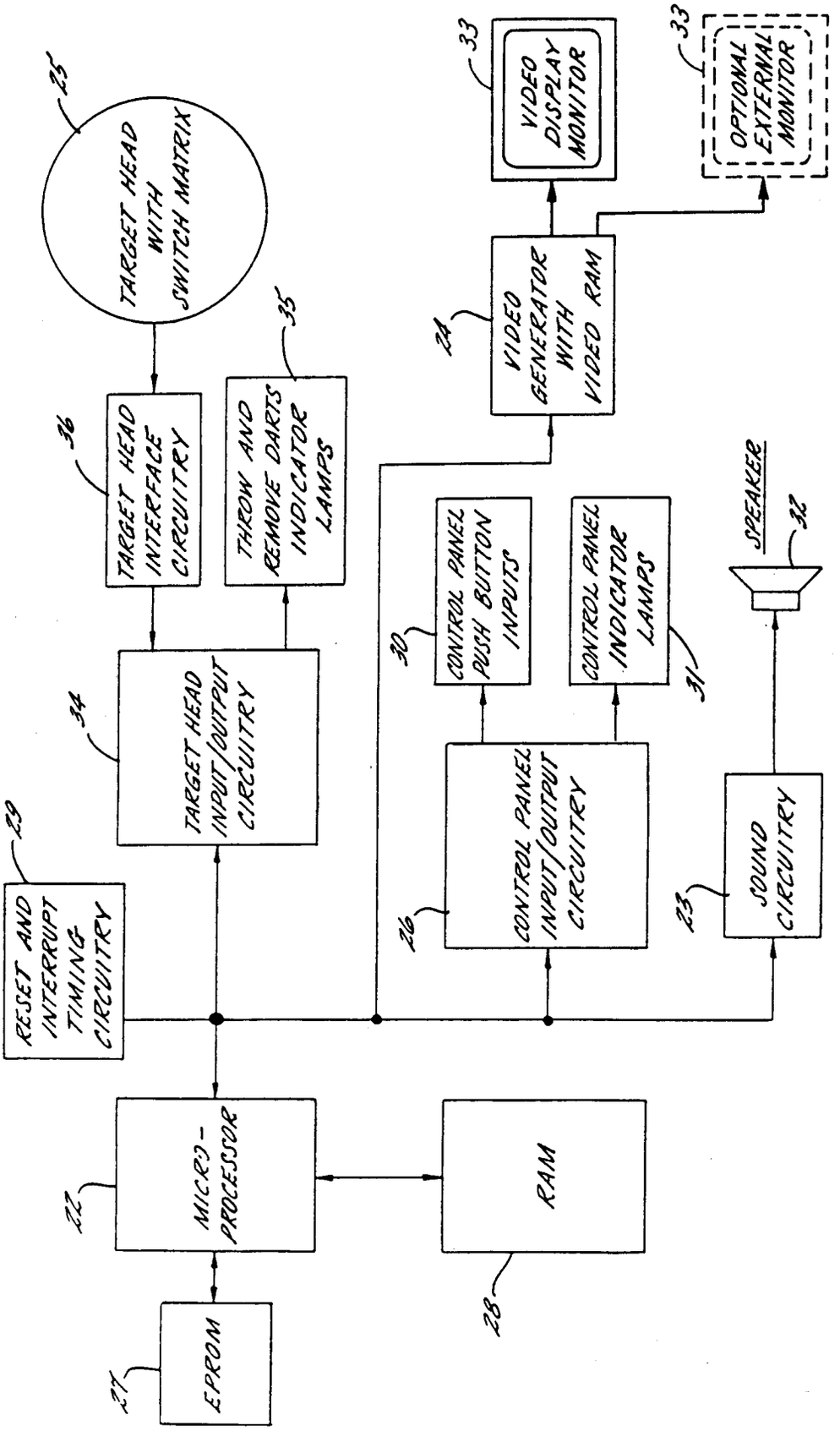

TARGET HEAD WITH SWITCH MATRIX
25
TARGET HEAD INTERFACE CIRCUITRY
36
THROW AND REMOVE DARTS INDICATOR LAMPS
35
TARGET HEAD INPUT/OUTPUT CIRCUITRY
34
RESET AND INTERRUPT TIMING CIRCUITRY
29
MICRO-PROCESSOR
22
EPROM
27
RAM
28
VIDEO GENERATOR WITH VIDEO RAM
24
VIDEO DISPLAY MONITOR
33
OPTIONAL EXTERNAL MONITOR
33'
CONTROL PANEL PUSH BUTTON INPUTS
30
CONTROL PANEL INPUT/OUTPUT CIRCUITRY
26
CONTROL PANEL INDICATOR LAMPS
31
SOUND CIRCUITRY
23
SPEAKER
32

FIG. 2.

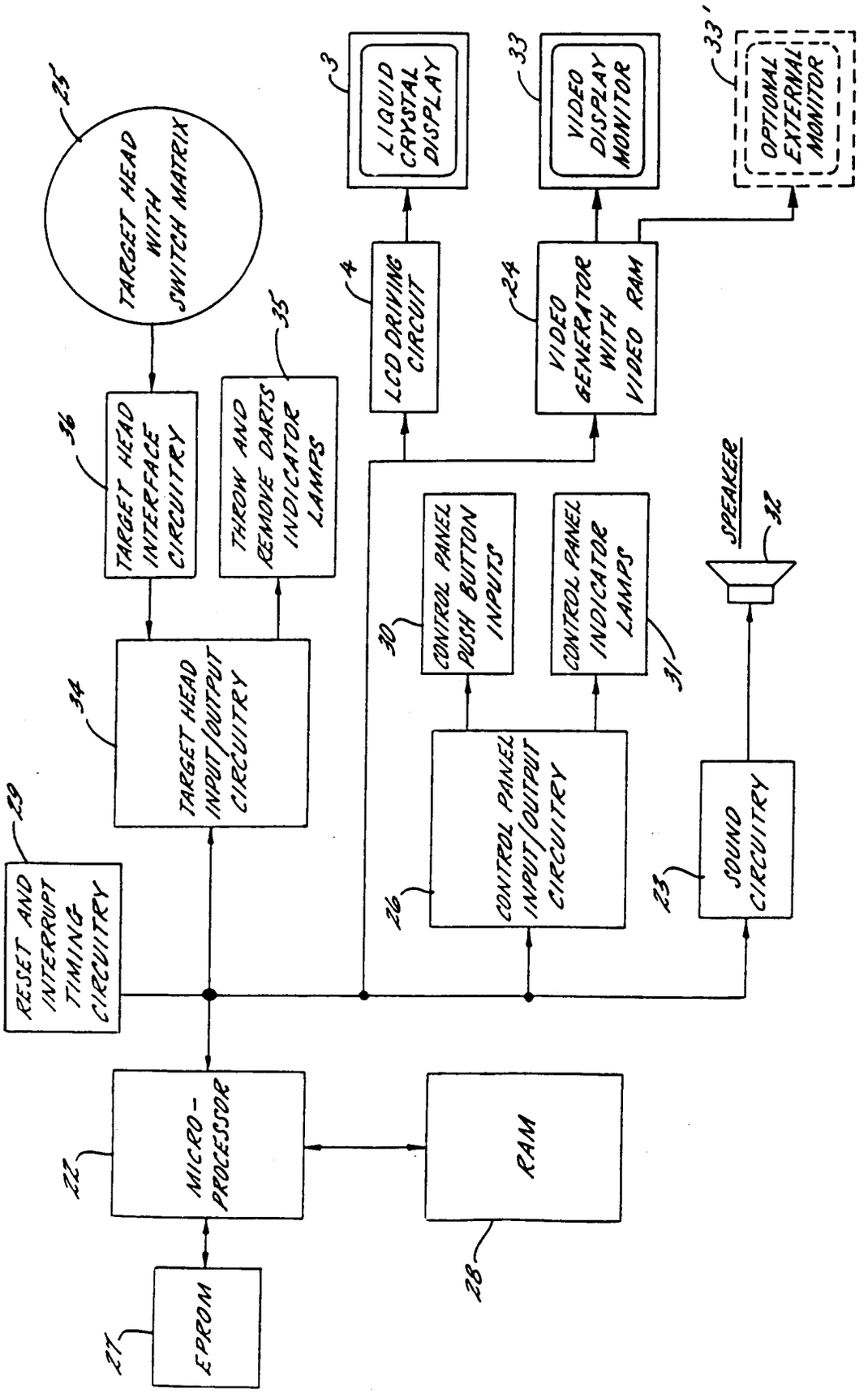

TARGET HEAD WITH SWITCH MATRIX
25
LIQUID CRYSTAL DISPLAY
3
VIDEO DISPLAY MONITOR
33
OPTIONAL EXTERNAL MONITOR
33'
LCD DRIVING CIRCUIT
4
VIDEO GENERATOR WITH VIDEO RAM
24
TARGET HEAD INTERFACE CIRCUITRY
36
THROW AND REMOVE DARTS INDICATOR LAMPS
35
CONTROL PANEL PUSH BUTTON INPUTS
30
CONTROL PANEL INDICATOR LAMPS
31
SPEAKER
32
TARGET HEAD INPUT/OUTPUT CIRCUITRY
34
RESET AND INTERRUPT TIMING CIRCUITRY
29
CONTROL PANEL INPUT/OUTPUT CIRCUITRY
26
SOUND CIRCUITRY
23
MICRO-PROCESSOR
22
RAM
28
EPROM
27

FIG. 2a

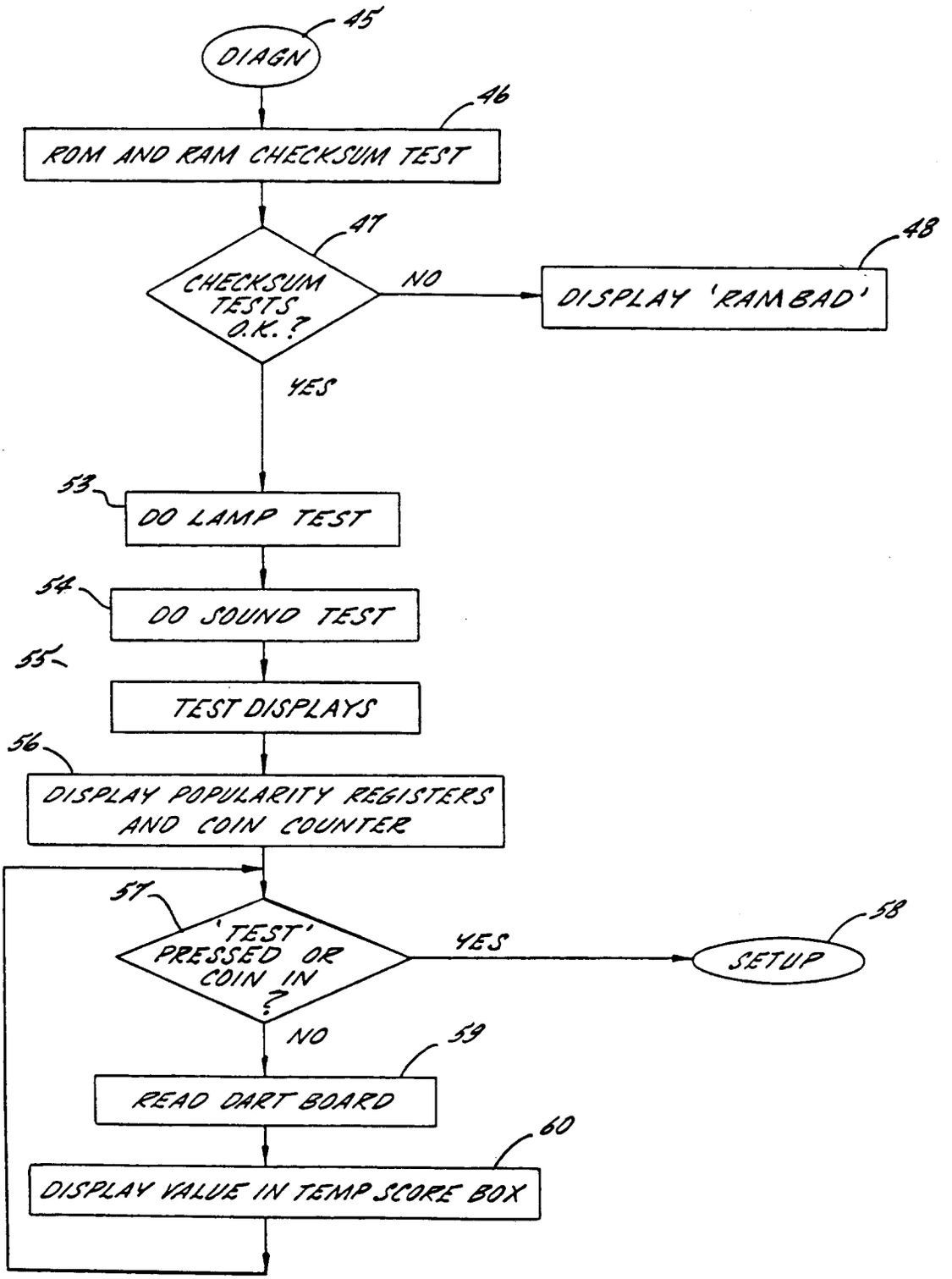

45
DIAGN
46
ROM AND RAM CHECKSUM TEST
47
CHECKSUM TESTS O.K.?
NO
48
DISPLAY 'RAMBAD'
YES
53
DO LAMP TEST
54
DO SOUND TEST
55
TEST DISPLAYS
56
DISPLAY POPULARITY REGISTERS AND COIN COUNTER
57
'TEST' PRESSED OR COIN IN ?
YES
58
SETUP
NO
59
READ DART BOARD
60
DISPLAY VALUE IN TEMP SCORE BOX

Fig. 4.

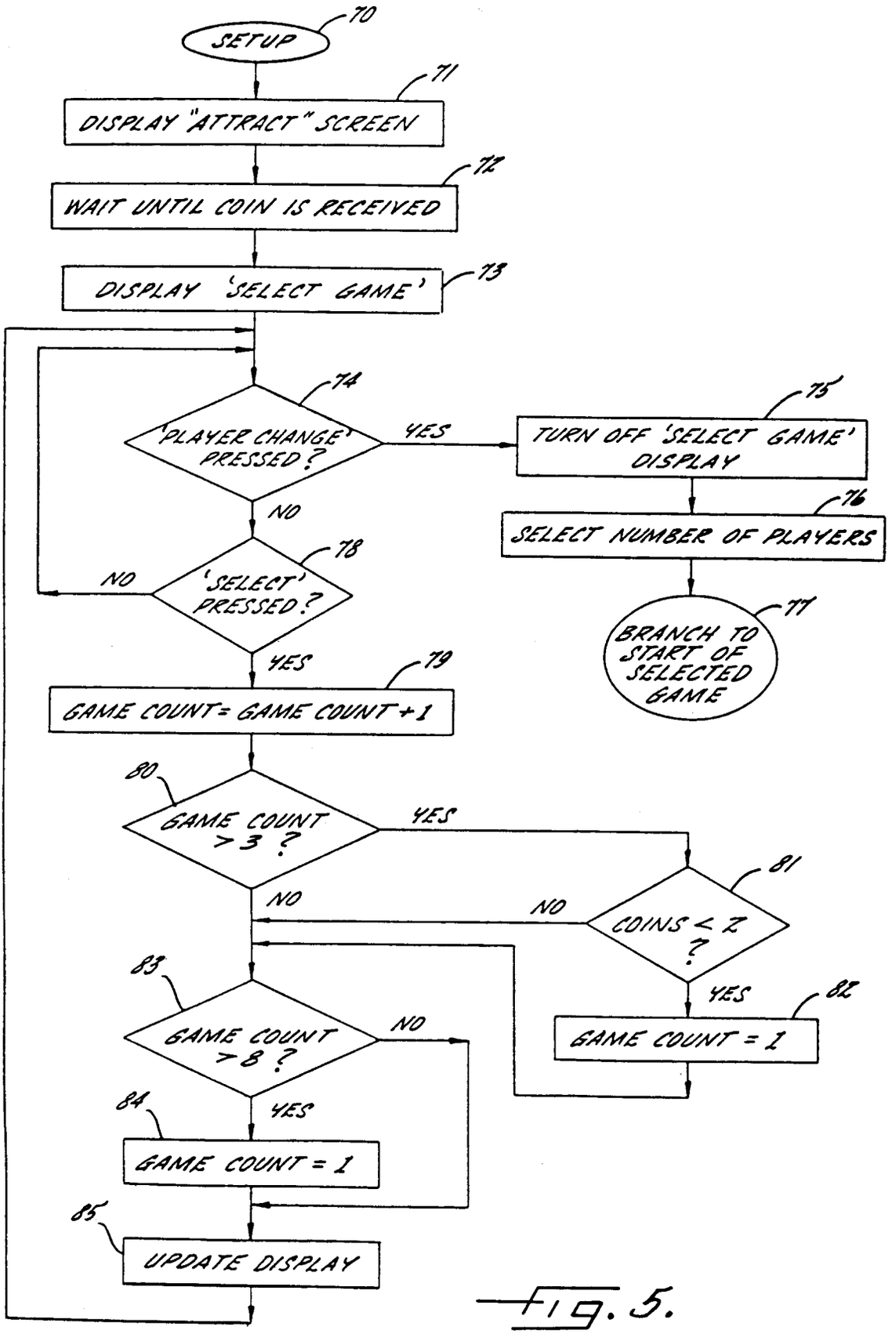

70
SETUP
71
DISPLAY "ATTRACT" SCREEN
72
WAIT UNTIL COIN IS RECEIVED
73
DISPLAY 'SELECT GAME'
74
'PLAYER CHANGE' PRESSED?
YES
75
TURN OFF 'SELECT GAME' DISPLAY
NO
76
SELECT NUMBER OF PLAYERS
78
'SELECT' PRESSED?
NO
77
BRANCH TO START OF SELECTED GAME
YES
79
GAME COUNT = GAME COUNT + 1
80
GAME COUNT > 3?
YES
81
NO
NO
COINS < 2?
83
YES
82
GAME COUNT > 8?
NO
GAME COUNT = 1
84
YES
GAME COUNT = 1
85
UPDATE DISPLAY

Fig. 5.

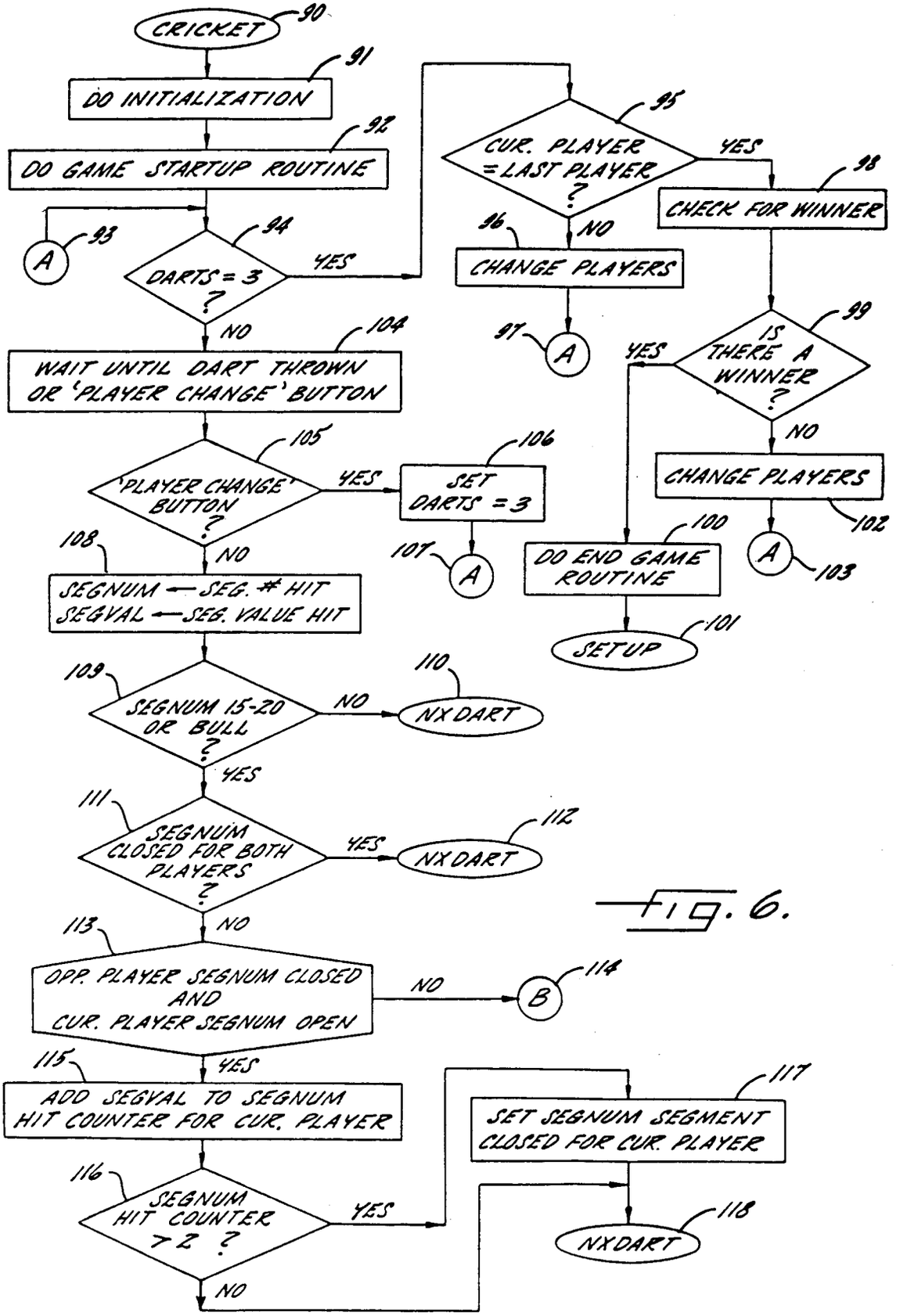

CRICKET
90
DO INITIALIZATION
91
DO GAME STARTUP ROUTINE
92
A
93
DARTS = 3 ?
94
YES
NO
WAIT UNTIL DART THROWN OR 'PLAYER CHANGE' BUTTON
104
'PLAYER CHANGE' BUTTON ?
105
YES
SET DARTS = 3
106
107
A
NO
SEGNUM ← SEG. # HIT
SEGVAL ← SEG. VALUE HIT
108
SEGNUM 15-20 OR BULL ?
109
NO
NX DART
110
YES
SEGNUM CLOSED FOR BOTH PLAYERS ?
111
YES
NX DART
112
NO
OPP. PLAYER SEGNUM CLOSED AND CUR. PLAYER SEGNUM OPEN
113
NO
B
114
YES
ADD SEGVAL TO SEGNUM HIT COUNTER FOR CUR. PLAYER
115
SEGNUM HIT COUNTER 7 ?
116
YES
NO
SET SEGNUM SEGMENT CLOSED FOR CUR. PLAYER
117
NX DART
118
CUR. PLAYER = LAST PLAYER ?
95
YES
NO
CHANGE PLAYERS
96
97
A
CHECK FOR WINNER
98
IS THERE A WINNER ?
99
YES
NO
CHANGE PLAYERS
102
A
103
DO END GAME ROUTINE
100
SETUP
101

Fig. 6.

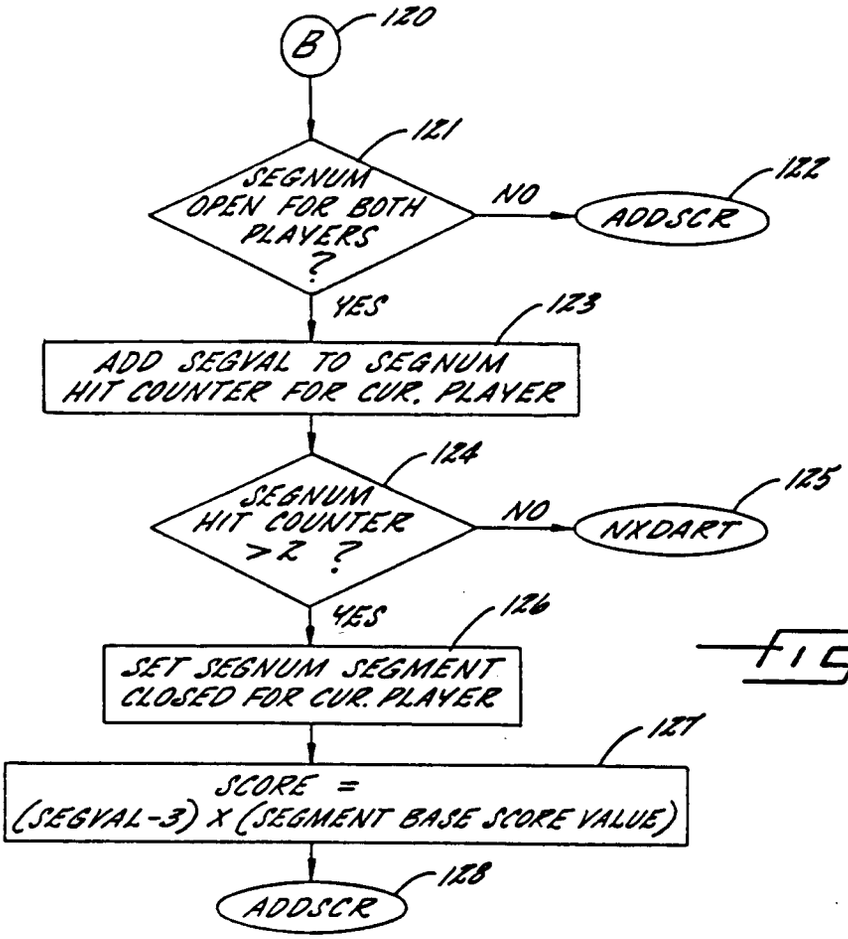


Fig. 7.

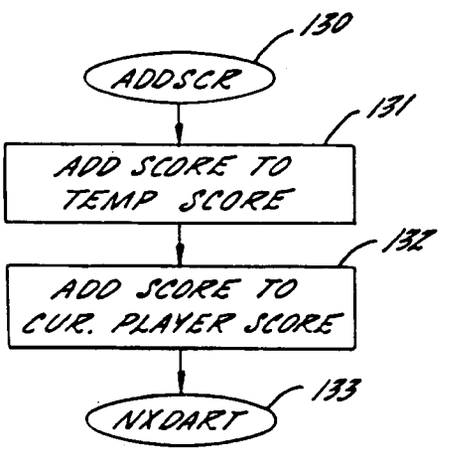


Fig. 8.

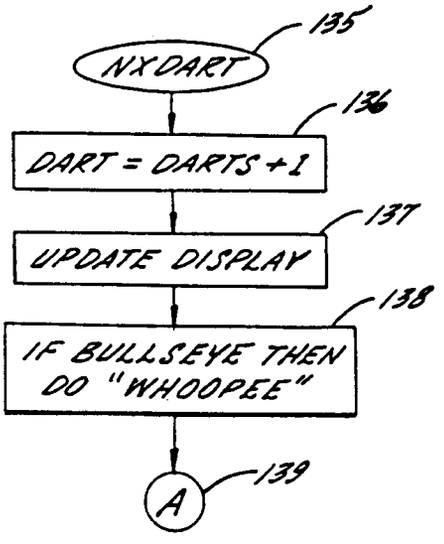


Fig. 9.